

# NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering  
Materials Laboratory Division  
Washington, D.C. 20594



May 17, 2016

## MATERIALS LABORATORY FACTUAL REPORT

Report No. 16-047

### A. ACCIDENT INFORMATION

Place : McAllen, Texas  
Date : August 17, 2015  
Vehicle : Zenair CH2000  
NTSB No. : CEN15FA362  
Investigator : Josh Lindberg, AS-ERA

### B. COMPONENTS EXAMINED

Throttle control assembly with cut cable segment.

### C. DETAILS OF THE EXAMINATION

Overall views of the throttle control assembly are shown in figure 1. The control assembly was discolored and oxidized consistent with exposure to a fire. The surface of the aluminum alloy housing also was wrinkled consistent with exposure to high heat. The control cable had been cut at the location indicated in figure 1. The cable was bent approximately 90 degrees at the output end of the input tube, and the spiral wrap around the cable housing wires was fractured and displaced at the location of the bend. The input rod was also bent slightly where it intersected the lock screw opening (see figure 2).

Dimensional measurements were taken of the input control positions using Vernier calipers. The exposed portion of the input rod between the lock screw and the jam nut for the input knob measured 1.103 inches. The gap between the underside (panel side) of the knurled lock screw head and the end of the housing was 0.104 inch. These measurements of the input assembly are indicated in figure 1.

Radiographs of the throttle control input assembly are shown in figures 2 and 3. The lock mechanism, shown in figure 2, had a gap between the lock screw and the lock bushings as indicated, consistent with an unlocked position. The output end of the input assembly is shown in figure 3. The cable was straight in the segment within the input tube between the input rod and the cable housing as shown in figure 3.

The area shown in figure 2 was further examined using X-ray computed tomography (CT). In order to facilitate the CT examination, a transverse cut was made through the input tube and the input rod approximately 2.25 inches away from the housing threads, and the tube outer diameter was machined to a reduced diameter to fit

within a chuck in the CT stage. CT images of the lock mechanism showed gaps present around much of the circumference of the lock bushings consistent with an unlocked position.

After the CT examination was complete, the input rod was manipulated by hand. Initially, the input knob was pushed inward (toward the panel as installed on the airplane), and the rod moved slightly under hand forces. Next the input knob was pulled in the opposite direction, and the input rod slid completely out of the assembly with minimal hand forces. A view of the input assembly after the rod was removed is shown in figure 4.

Matthew R. Fox  
Senior Materials Engineer

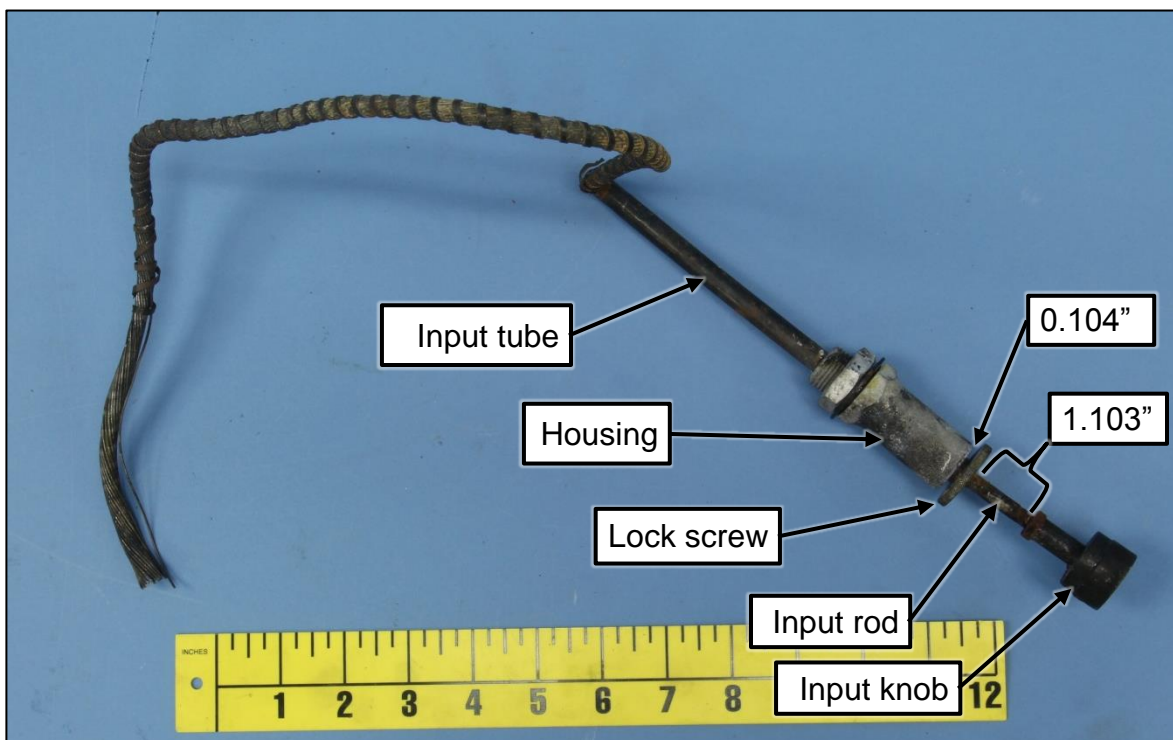
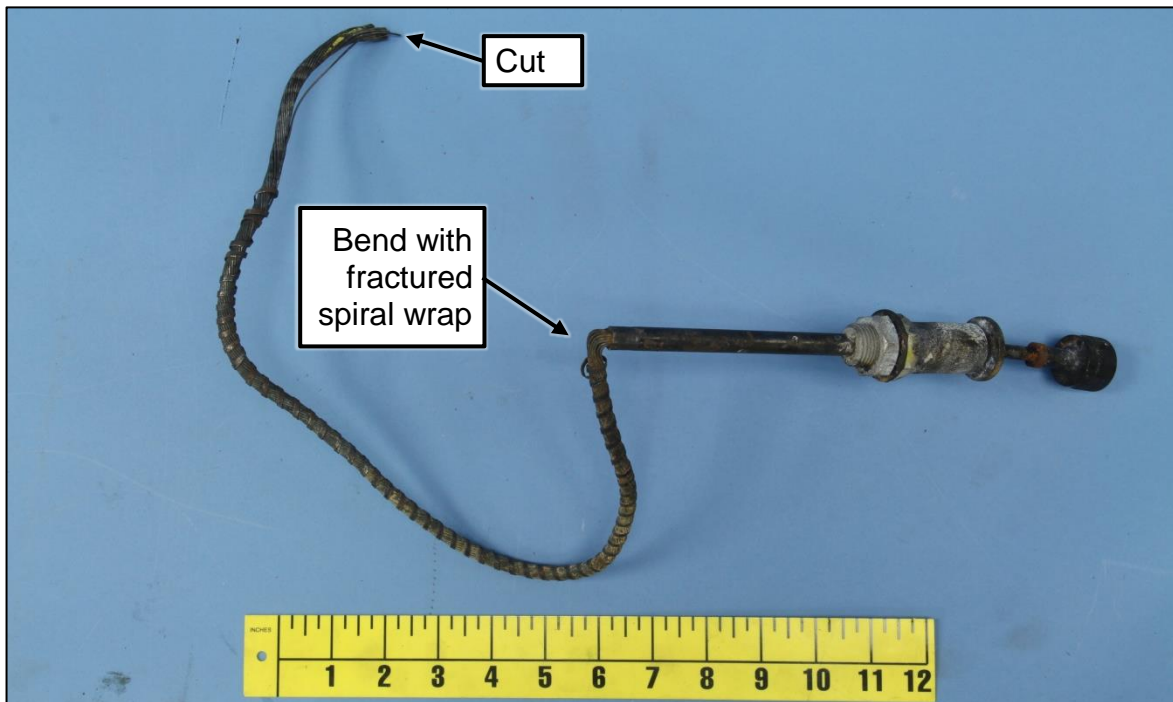


Figure 1. Overall views of the throttle control assembly. The cable was cut at the location indicated.

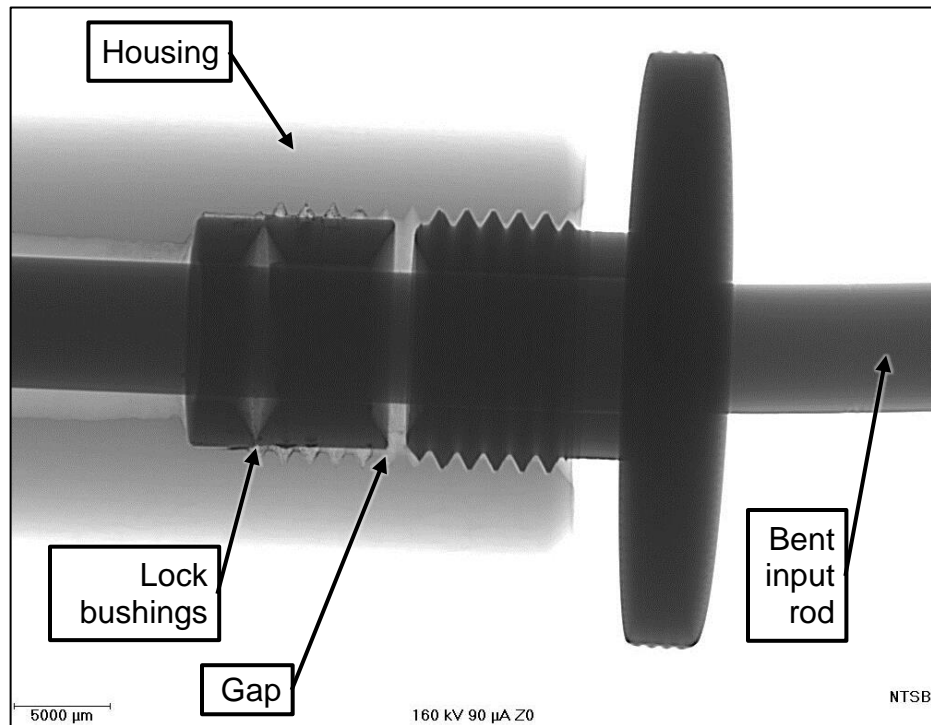


Figure 2. Radiograph of the lock mechanism at the input end of the control housing showing a gap between the lock screw and the lock bushings.

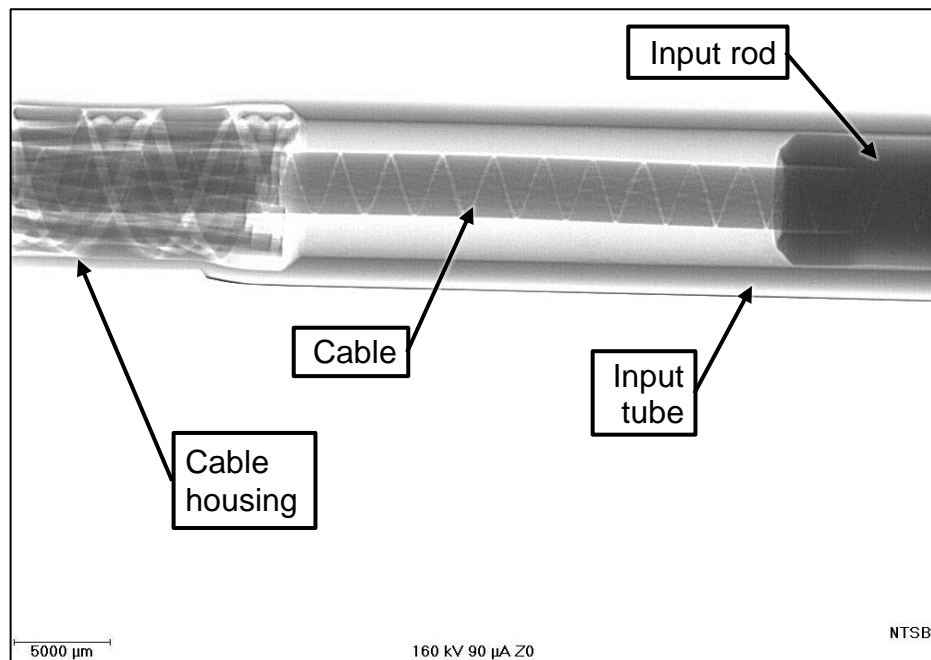


Figure 3. Radiograph of the input assembly at the output end of the input tube.



Figure 4. Throttle control assembly after cutting and machining to facilitate a CT examination followed by removal of the input rod by hand.